

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: 87309525.1

(61) Int. Cl.<sup>4</sup>: D06N 7/00, B05C 11/04

(22) Date of filing: 28.10.87

(30) Priority: 03.11.86 GB 8626241

(43) Date of publication of application:  
11.05.88 Bulletin 88/19

(54) Designated Contracting States:  
AT BE CH DE ES FR GB GR IT LI LU NL SE

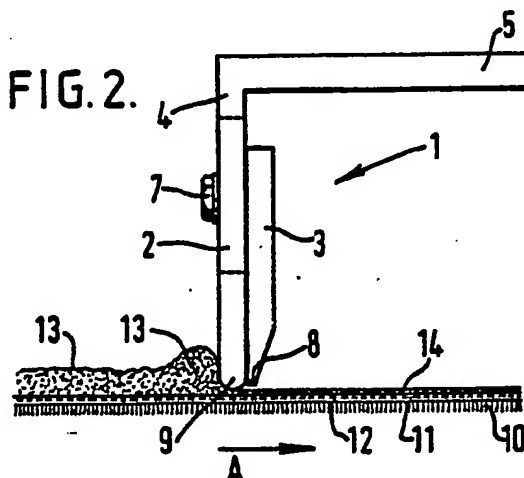
(71) Applicant: **WILTON ROYAL CARPETS LIMITED**  
Romsey Industrial Estate Great Bridge Road  
Romsey Hampshire, SO5 0HR(GB)

(72) Inventor: **Hawkes, Gilbert Edward**  
5 North East Road Sholing  
Southampton Hampshire(GB)  
Inventor: **Fisher, Susan**  
20 The Spinney Calmore  
Southampton Hampshire(GB)

(74) Representative: **Purvis, William Michael**  
Cameron et al  
D. Young & Co. 10 Staple Inn  
London WC1V 7RD(GB)

(57) Improvements relating to the manufacture of carpet tiles.

(57) In the manufacture of carpet tiles an inverted strip of carpet (10) has a scrim (12) laid thereover and a base layer (11) of pasty PVC is deposited on the scrim (12) and doctored before being partially cured. Further pasty PVC (13) is then deposited on the base layer (11) and, as the carpet (11) passes beneath a doctor blade (1), is doctored to a finish layer (14) by the blade (1). The doctor blade (1) comprises a combination of a downstream straight edged chamfered member (3) with a narrow underface (8) and an upstream comb like member (2) with teeth (9) with rounded undersides and with the width of the teeth (9) not exceeding 25% of the tooth pitch.



**EP 0 266 959 A1**

**BEST AVAILABLE COPY**

## IMPROVEMENTS RELATING TO THE MANUFACTURE OF CARPET TILES

The invention relates to carpet tiles and more particularly to the manufacture thereof.

It has previously been proposed, for example in UK Specification No. 1 338 707, to manufacture carpet tiles by doctoring a layer of thermoplastics material to a predetermined thickness on a heat-resistant carrier sheet, laying carpeting in the orientation of use, that is to say with the tufts projecting upwardly, onto the doctored layer, applying heat through the carrier sheet to cure the layer of thermoplastics material and bond it to the carpeting, stripping off the carrier sheet and cutting the carpeting into tiles.

It has also been proposed to manufacture carpet tiles with the strip to be cut up into the tiles being formed in an orientation which is inverted having regard to its orientation of use. Previous proposals involved transporting tufted carpet in an inverted orientation on a conveyor, spreading a base layer of PVC on the carpet, partially curing the base layer, rolling a reinforcing mesh into the partially cured base layer, applying a finish layer of PVC over the base layer incorporating the reinforcing mesh, doctoring the finish layer, curing the base layer and the finish layer and embossing the combined layer. The strip of carpeting was subsequently cut into tiles.

Difficulties arose in obtaining uniform thicknesses of both base and finish layers so as to provide a controlled overall thickness for the coating and also with the location of the reinforcing mesh within the thickness of the coating varying unduly. Problems particularly tended to arise with the blade doctoring the finish layer of PVC onto the base layer snagging the reinforcing mesh embedded in the base layer and tending to lift it out of the base layer.

According to one aspect of the invention, a method of making carpet tiles comprises the steps of superimposing a reinforcing scrim and a strip of tufted carpet with the carpet in an orientation which is inverted having regard to the orientation of use and with the scrim overlying the carpet, doctoring a base layer of PVC onto the reinforcing scrim, at least partially curing the base layer, doctoring a finish layer of PVC onto the base layer, curing both the finish layer and the base layer and cutting the strip of carpet into tiles.

Thus the scrim is provided beneath the base layer rather than being provided as a sandwich filling between the base and finish layers and rolled into the base layer. The method of the invention has been found to result in a carpet which has the reinforcing scrim more uniformly located and more desirably located within the base layer, that is to

say the base layer penetrates into the scrim in a direction towards the carpet rather than in a direction away from the carpet. The method of the invention also avoids difficulties involved in rolling the scrim into a pasty and sticky base layer.

The scrim is preferably a grid of non-woven strands of glassfibre with the strands initially held in place by a PVC coating. When incorporated with the PVC forming the base layer, the PVC coating and the base layer merge together.

Thus, the strip of carpet can be mounted on a stenter and, as it passes beneath the doctor blade, PVC in paste form previously deposited on the carpet is doctored by the doctor blade to a grooved layer, an accumulated bead being formed extending across the width of the carpet upstream of the doctor blade.

According to another aspect of the invention a doctor blade used to doctor a finish layer of PVC onto a strip of carpet is used in an upright orientation, is of comb-like form and comprises a straight edged member and a toothed member in juxtaposition, the straight edged member is chamfered so as to have an underface which is narrow in the direction of movement of the strip of carpet and the comb-like member has teeth each with a rounded leading lower edge and of a width not exceeding 25% of the tooth pitch.

Preferably the toothed member is provided upstream of the straight edged member. Advantageously the teeth are also rounded on their trailing lower edge and the tooth width is 20% of the tooth pitch, that is to say the gaps between the teeth are four times as wide as the width of the teeth.

Preferably the toothed member and the straight edged member are secured together by means which permit relative height adjustment. Advantageously the toothed member is of L-shape.

PVC doctored by the doctor blade can be cured by heat, preferably in an infra-red gas oven, and cooled by passing the strip of carpet under water cooled rollers. During the curing the grooved layer of PVC tends to flow out to form a layer with a fairly smooth upper surface and of uniform thickness. The layer can be subsequently embossed.

The invention is diagrammatically illustrated by way of example in the accompanying drawing, in which:

Figure 1 is an elevation of a comb-like member of a doctor blade of apparatus to form a carpet according to said another aspect of the invention; and

Figure 2 is a side view showing the comb-like member of Figure 1 combined with a straight edged member to form a doctor blade and in operation coating a strip of carpet.

Referring to the drawing, a doctor blade 1 for doctoring a layer of PVC onto a carpet comprises a comb-like member 2 and a straight edged member 3. The comb-like member 2 has a vertical flange 4 and a horizontal flange 5 and the vertical flange 4 has slots 6 therein through which bolts 7 can be passed to engage in screw-threaded holes in the member 3 to clamp the members 2 and 3 together. Due to the length of the slots 6 the member 3 and the flange 4 of the member 2 are relatively adjustable in height. The lower edge of the member 3 is chamfered so that the underface 8 of the member 3 is only narrow when considered in the direction of movement A of a carpet being coated.

The comb-like member 2 has the lower edge of its flange 4 formed with teeth 9 and the width of the teeth in the embodiment shown in one quarter of the spacing between the teeth such that the width of each tooth is 20% of the tooth pitch. In one example, the teeth being of an overall height of 13 mm and the bottom edge of the teeth 9 projecting a distance of 0.8 mm below the underface 8 of the member 3. Figure 2 particularly shows that the teeth 9 are chamfered so that the undersides thereof are rounded, that is to say the corners have been removed.

The clamped together members 2,3 can be mounted by means of the flange 5 to overlie a stenter on which a strip of carpeting 10 is conveyed. Advantageously, the strip of carpeting is secured on the stenter by spikes projecting through the lateral edges of the strip of carpeting whereby it is under some tension. At a stage prior to that illustrated in Figure 2, the strip of carpeting with a layer of scrim laid thereover is coated with a base layer of PVC by having PVC in pasty form deposited on the carpet and the carpet passed beneath a plain doctor blade. The doctor blade forces the pasty PVC through the scrim and into engagement with the carpet leaving the PVC as a uniform base layer on the carpet with the scrim embedded in the base layer. The base layer is then cured and the carpet is brought to the apparatus shown in Figure 2 where further PVC 13 in pasty form is deposited upon the base layer 11 of cured PVC with the scrim 12 embedded therein. The combined member 2,3 doctors the PVC 13 to a grooved finish layer 14 overlying the base layer 11 containing the scrim 12 without risk of the teeth 9 of the member 2 snagging the scrim 12. It can be seen that the PVC forms a uniform bead 13a behind, that is to say upstream of the member 2 which is provided upstream of the member 3. The composite layer of

PVC formed by the layers 11 and 14 is subsequently cured, embossed and cooled and the carpeting is cut into tiles if desired or may be sold in roll form.

## Claims

1. A method of making carpet tiles characterised by the steps of superimposing a reinforcing scrim (12) and a strip of tufted carpet (10) with the carpet (10) in an orientation which is inverted having regard to the orientation of use and with the scrim (12) overlying the carpet, doctoring a base layer (11) of PVC onto the reinforcing scrim (12), at least partially curing the base layer (11), doctoring a finish layer (14) of PVC (13) onto the base layer (11), curing both the finish layer (14) and the base layer (11) and cutting the strip of carpet (10) into tiles.

2. A method according to claim 1, in which the scrim (12) is a grid of non-woven strands of glass-fibre with the strands initially held in place by a PVC coating, which coating when the scrim (12) is incorporated with the PVC forming the base layer (11) merges with the base layer (11).

3. A method according to claim 1 or claim 2, in which the strip of carpet (10) is mounted on a stenter and, as it passes beneath a doctor blade (1), PVC (13) in paste form previously deposited on the carpet (10) is doctor'd by the doctor blade (1) to a grooved layer (14), an accumulated bead (13a) being formed extending across the width of the carpet (10) upstream of the doctor blade (1).

4. A doctor blade (1) to be used to doctor a finish layer (14) of PVC (13) onto a strip of carpet (10) characterised in that the blade (1) is to be used in an upright orientation, is of comb-like form and comprises a straight edged member (2) and a toothed member (3) in juxtaposition, the straight edged member (2) is chamfered so as to have an underface (8) which is narrow in the direction of movement (A) of the strip of carpet (10) and the comb-like member (3) has teeth (9) each with a rounded leading lower edge and of a width not exceeding 25% of the tooth pitch.

5. A doctor blade according to claim 4, in which the toothed member is provided upstream of the straight edged member (3).

6. A doctor blade according to claim 4 or claim 5, in which each of the teeth (9) is also rounded on its trailing lower edge and the tooth width is 20% of the tooth pitch.

7. A doctor blade according to any one of claims 4 to 6, in which the toothed member (3) and the straight edged member (2) are secured together by means (6, 7) which permit relative height adjustment.

8. A doctor blade according to any one of claims 4 to 7, in which the toothed member (3) is of L-shaped.

5

10

15

20

25

30

35

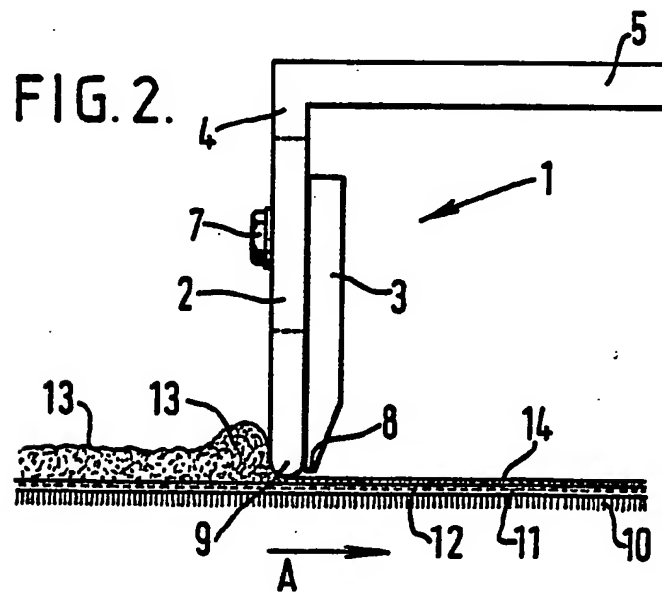
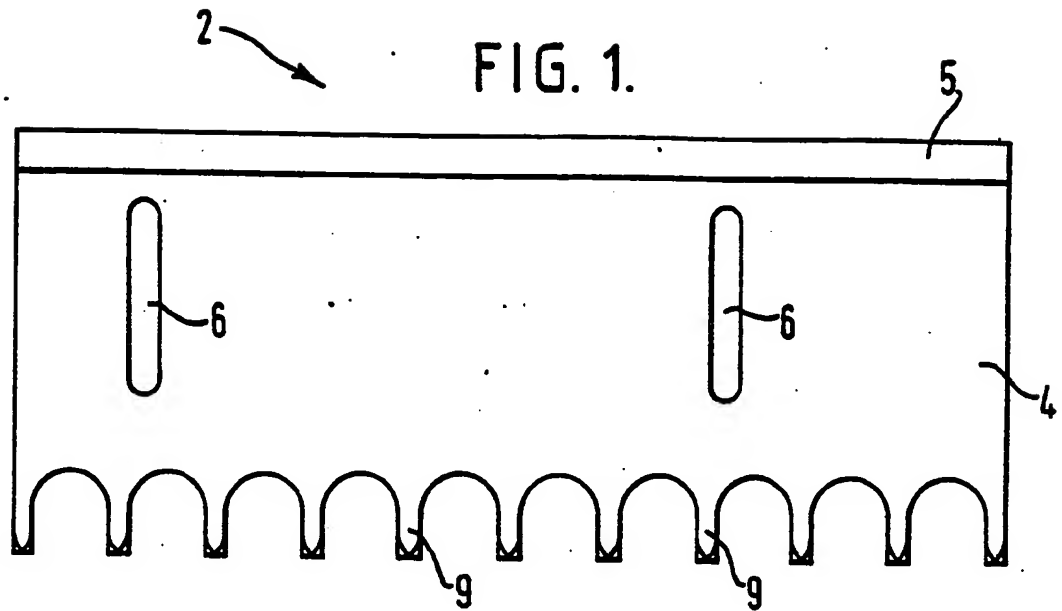
40

45

50

55

4





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 87 30 9525

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	L'INDUSTRIE TEXTILE, no. 1161, December 1985, page 1179, Paris, FR; "Dalle-moquette traitée" * Whole article *	1-3	D 06 N 7/00 B 05 C 11/04
Y	EP-A-0 171 201 (NIPPON OIL CO. LTD) * Figure 1; page 9, line 19 - page 11, line 7; examples *	1-3	
Y	EP-A-0 176 346 (MILLIKEN RESEARCH CORP.) * Whole document *	1-3	
A	DE-A-2 129 055 (ARTOS DR. ING. MEIER WINDHORST KG) * Claim; examples 1,2 *	1	
A	FR-A-2 439 043 (JAGENBERG-WERKE AG) * Page 6, lines 3-12; figure 5 *	4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D 06 N B 05 C B 05 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03-02-1988	Examiner PFANNENSTEIN H.F.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		I : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 150 (03.82) (P0401)

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**